

upgrade their local network capabilities, through, for example, installation of high-capacity SONET rings that provide fiber optic links directly to larger business customers and through the announced deployment of xDSL technologies to expand the capacity of existing copper loops. 20/ Cable television companies are beginning to offer high-speed internet access through the use of cable modems. This investment by competitive LECs, incumbent LECs, cable television companies and others hopefully will accelerate as consumers demand higher bandwidth to reach the already large capabilities of international multimedia networks such as Qwest's.

In considering whether current deployment of last mile advanced telecommunications capability is "timely," the Commission should recognize that economic considerations drive the speed and extent of investment in advanced network capabilities, not the regulatory climate. In fact, most of the major ILECs

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20/ All of the RBOCs and GTE have announced deployment of xDSL technology in their regions. See "Bells, GTE, and Computer Giants Say ADSL Working Group Will Speed Deployment," Telecommunications Reports, February 2, 1998, at 23-24 (US West); "SBC's Pacific Bell Unit Unveils ADSL Plans, Files Pricing Tariff," Telecommunications Reports, June 1, 1998, at 34 (SBC); "Bell Atlantic to Offer High-Speed Links to Net," Washington Post, June 4, 1998, at E3; "BellSouth Plots Ambitious ADSL Plan," Multichannel News, May 25, 1998, at 1 (BellSouth and Ameritech); News Release, "BellSouth Announces Aggressive 30 Market Roll-Out of Ultra-High Speed BellSouth.Net FastAccess ADSL Internet Services," May 20, 1998, at [www.bellsouthcorp.com](http://www.bellsouthcorp.com); "GTE Jumps Into xDSL Game as UAWG Works on Standard," Telecommunications Reports, April 20, 1998, at 18; "GTE to Offer Ultra-Fast Internet Access," April 13, 1998, Announcement on GTE website, [www.gte.com/g/news/adsl041398.html](http://www.gte.com/g/news/adsl041398.html).

already have announced plans to deploy xDSL service on a broad basis. 21/ The demand for advanced services -- and the need for access to those services -- is real.

The Commission should not be swayed by arguments offered up by incumbents seeking deregulated treatment in exchange for promises of faster investment in advanced technology. As the Commission correctly held in its Section 706 Order/NPRM, ILEC investment in advanced telecommunications capabilities is fully subject to the Act's local market-opening provisions. ILECs will invest in advanced technology when and if it is economically justifiable to do so (or if they need to respond to competition). The ILECs do not need --- and clearly should not be granted -- a monopoly in advanced last-mile telecommunications capability or deregulated status in order to invest in advanced services. 22/

**B. Deployment of Advanced Last Mile Facilities is "Reasonable" Only if Open to Competitors.**

The Commission also must examine whether the deployment of last mile advanced facilities is "reasonable" under Section 706. The NOI correctly recognizes that last mile deployment of advanced telecommunications capability has not yet occurred on a widespread basis, but also correctly recognizes that last mile facility owners could enjoy market power insofar as they compete with other

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21/ Id.

22/ See NOI at paras. 69-72. Section 251 of the Act, 47 U.S.C. § 251, requires that ILECs be fairly compensated for the use of their advanced network capabilities by competitors.

service vendors who require use of broadband local exchange network capabilities to deliver services to customers. 23/

The hallmark of “reasonable” deployment under Section 706 is deployment that *expands* the telecommunications capabilities available to customers and service providers without *limiting* customer choice or competitor access to those customers. The challenge for the Commission will be to ensure that the advanced communications services market does not become concentrated due to the economics of last mile investment.

It will not be possible simply to rely on ILEC competitors to construct their own last mile facilities. The economics of investment in the last mile makes it unlikely that multiple carriers will be able to justify construction of high-capacity facilities to each customer. This will be especially true for small business and residential customers and customers in rural areas. Even in the long term, there will be far fewer facilities-based providers than there will be potential service providers. In the short term, there are unlikely to be more than one (or possibly two) broadband service providers to most premises.

The Commission therefore must adopt and enforce policies that will ensure the ability of *all* potential service providers to reach any customer over

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23/ See, e.g., NOI at paras. 79, 82.

advanced last mile network facilities -- whether they are providing telecommunications services or information services.

In the interexchange market, there are at least five nationwide networks, including the Qwest network, a number of additional regional networks, and hundreds of retail providers of interexchange telecommunications services. Demand continues to be high for these networks -- and particularly for the high-capacity, high-speed capabilities of networks like Qwest's. Significantly, there is also a vigorous carrier's-carrier business in the interexchange market, with the network providers soliciting and vigorously competing for the business of other carriers. The ability of service providers to ride the networks of other carriers has been the impetus behind the growth and development of competition in the interexchange market. The same has not yet been true for the "last mile." Commission policy should now promote similar competition in the high-speed local market in order to generate the same results.

The Commission therefore should adopt policies that will enable competitive service providers to reach consumers with competitive products, and not just leave consumers with one or two practical choices for providers of advanced services. For example, the FCC should continue to apply the full range of local market-opening provisions to ILECs as they expand the capacity of local exchange facilities -- including the provisions guaranteeing access to unbundled network

elements and resale at wholesale rates. 24/ The Commission also should enforce the requirements of the Act that enable competitors to construct and interconnect competing advanced networks -- such as the collocation and unbundled loop provisions proposed in the Commission's Advanced Services NPRM. 25/

The Commission also should take additional steps to make high-bandwidth loops available to carriers and end users who seek to access the high-bandwidth capabilities of networks like Qwest's. Qwest and its customers need unrestricted access to all high-capacity media in the last mile -- whether it is DS-3, OC-N, or dark fiber. ILEC competitors have encountered numerous difficulties in obtaining ready and reasonably priced access to high-bandwidth local facilities that are already in place. Qwest urges the Commission to make it clear to ILECs that they cannot withhold access to high-capacity loops (whether ordered as interstate "special access" or as unbundled network elements) if that capability exists in the ILEC network. Qwest also urges the Commission to make it clear that ILECs must lease local dark fiber to other carriers, both in the loop and in the ILEC's interoffice network. See NOI at para. 23. This would significantly advance the goal of deploying advanced telecommunications capability all the way to the end user.

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24/ 47 U.S.C. § 251(c)(3),(c)(4).

25/ Deployment of Wireline Services Offering Advanced Telecommunications Capability, CC Docket No. 98-147, et al., FCC 98-188, released August 7, 1998 ("Advanced Services NPRM").

Qwest also needs the ability to collocate its fiber facilities and switching and router equipment in ILEC central offices in order to take maximum advantage of existing high capacity loops. In its comments on the Advanced Services NPRM, Qwest will strongly support measures to reduce the high cost of collocation and to address the other difficulties that ILEC competitors have encountered with collocation (such as space availability, size requirements, and limitations on collocation of switching equipment).

Qwest looks forward to reviewing these initial comments in response to the Commission's NOI, and reserves the right to comment in reply to the specific proposals offered by other parties.

## **CONCLUSION**

The Commission should recognize the speed and depth of deployment of competitive advanced telecommunications capability in long distance networks, as evidenced by the creation of the Qwest network and others. To speed deployment in the "last mile," the Commission should vigorously enforce the Act's local market-

opening provisions and take steps to ensure that customers will have access to a diversity of service providers as bandwidth is opened up in the last mile.

Respectfully submitted,

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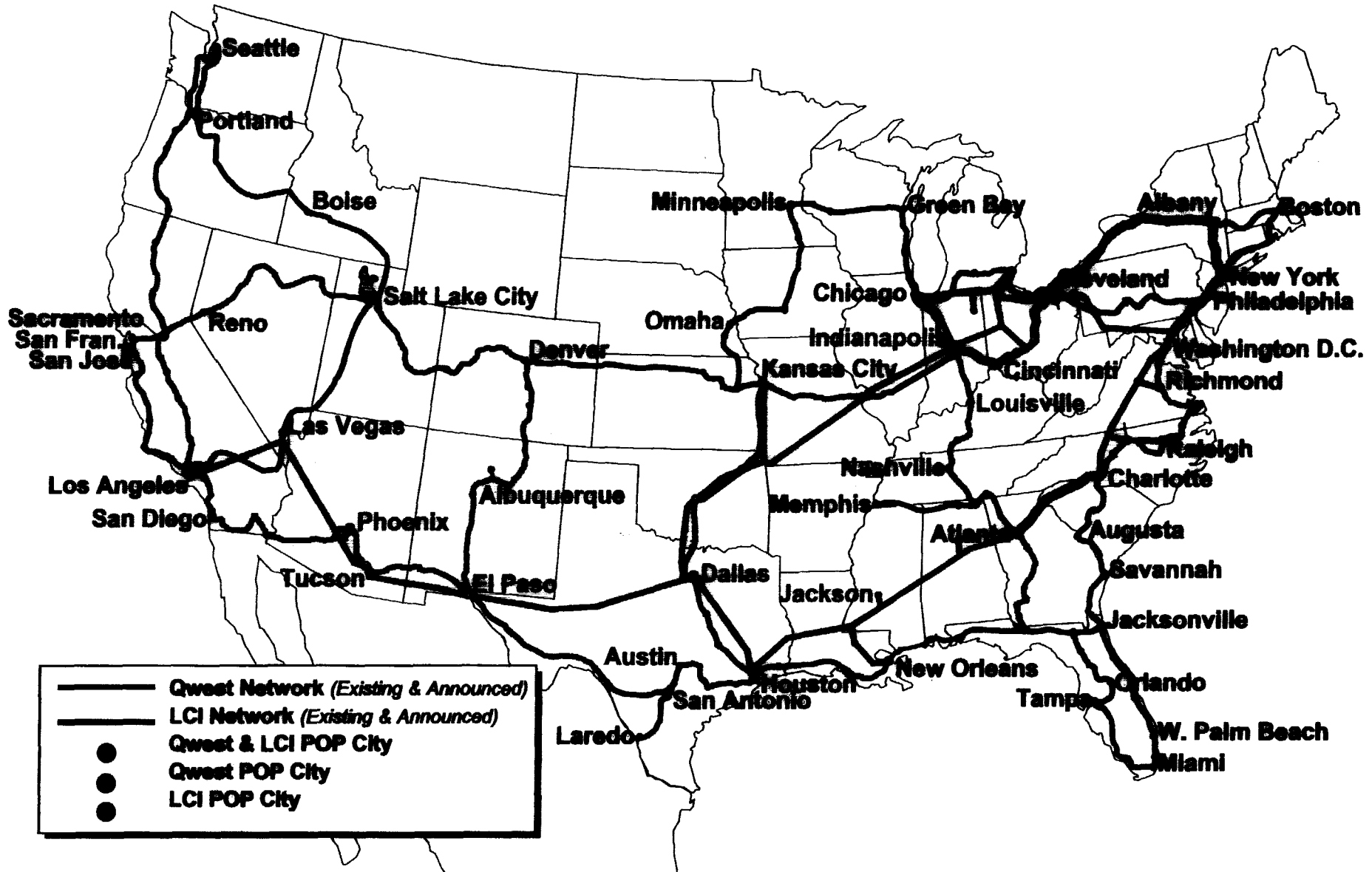
September 14, 1998

**APPENDIX A**

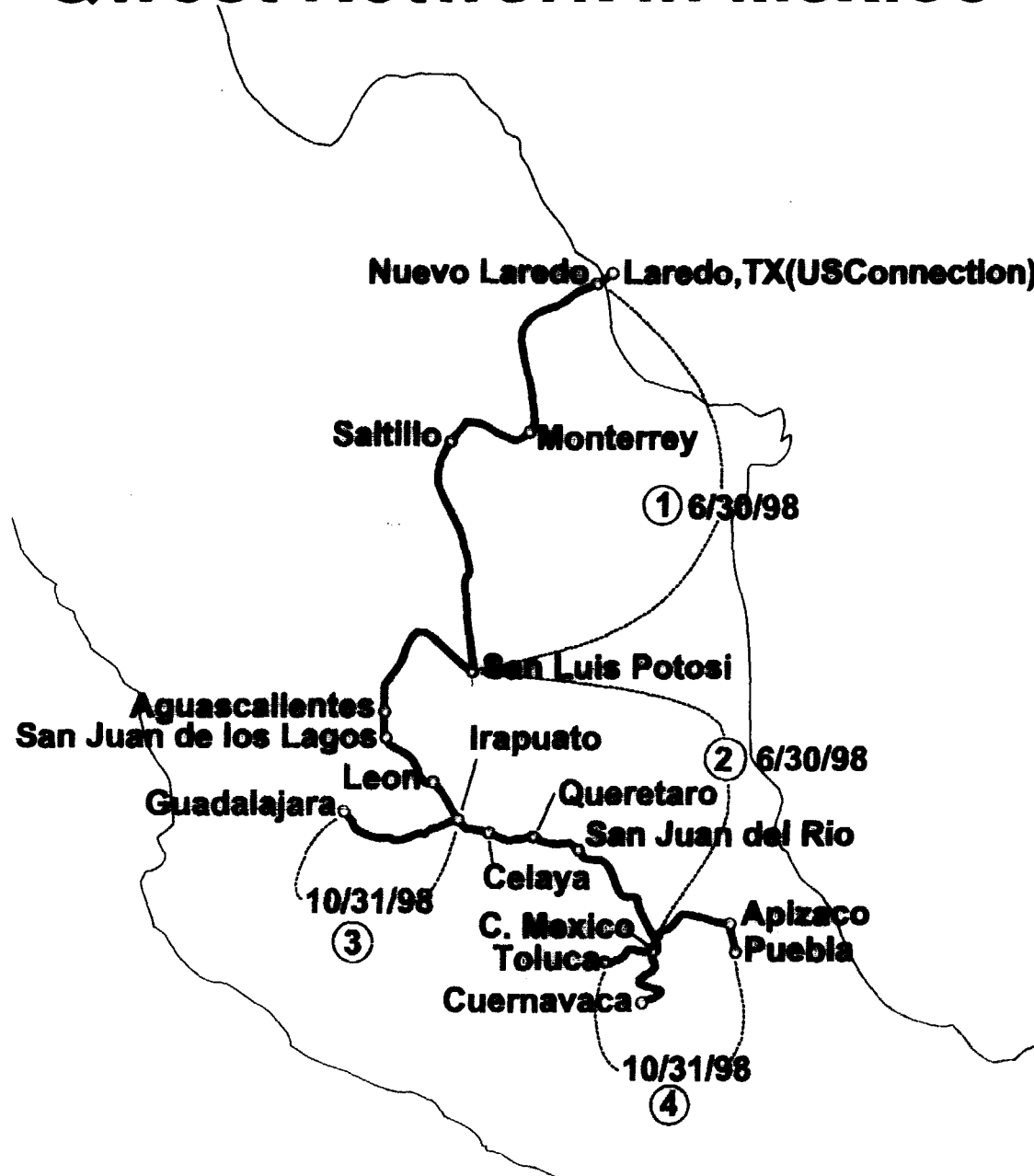
**MAPS OF QWEST NETWORK**



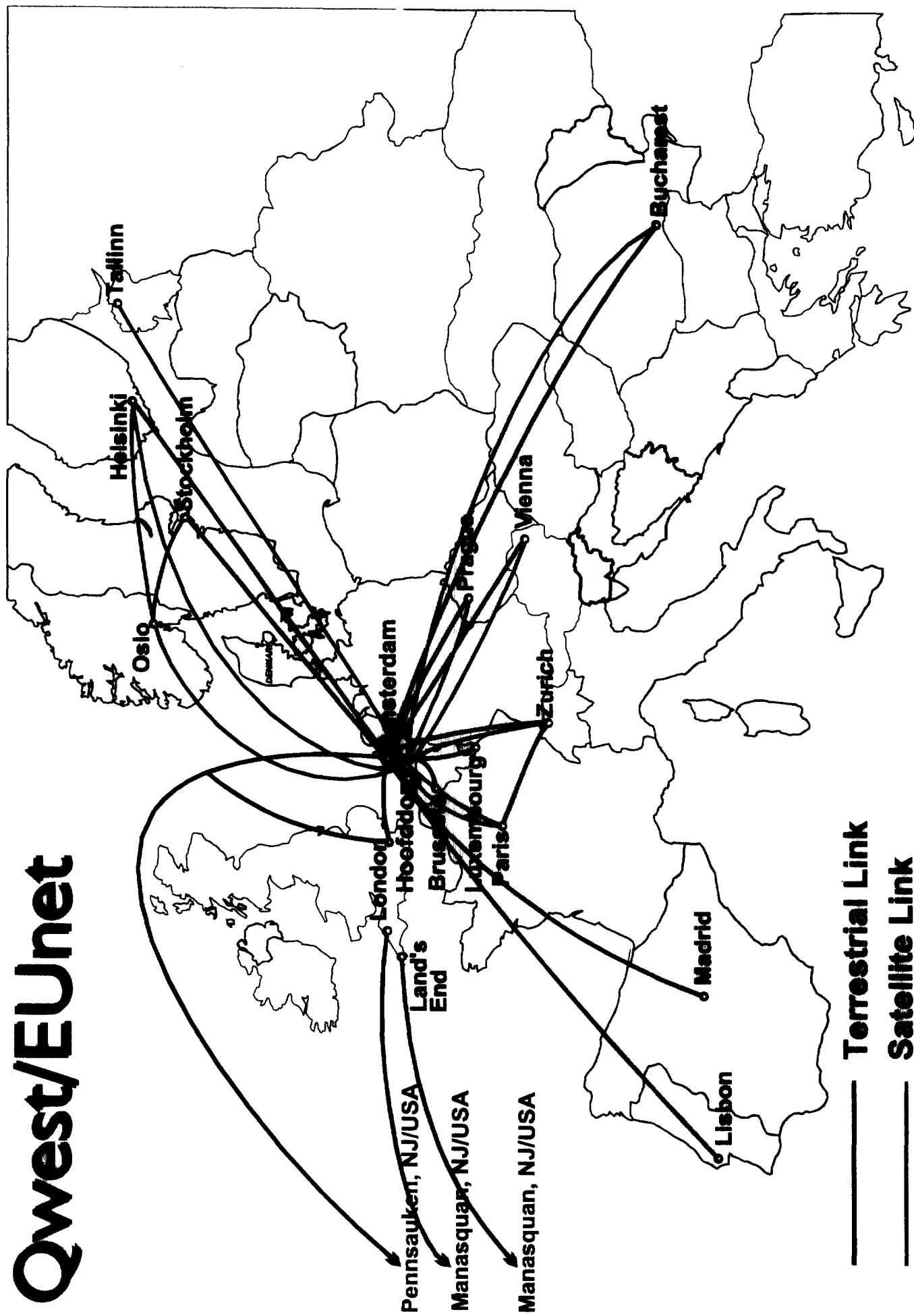
# Qwest/LCI Nationwide Network



# Qwest Network in Mexico

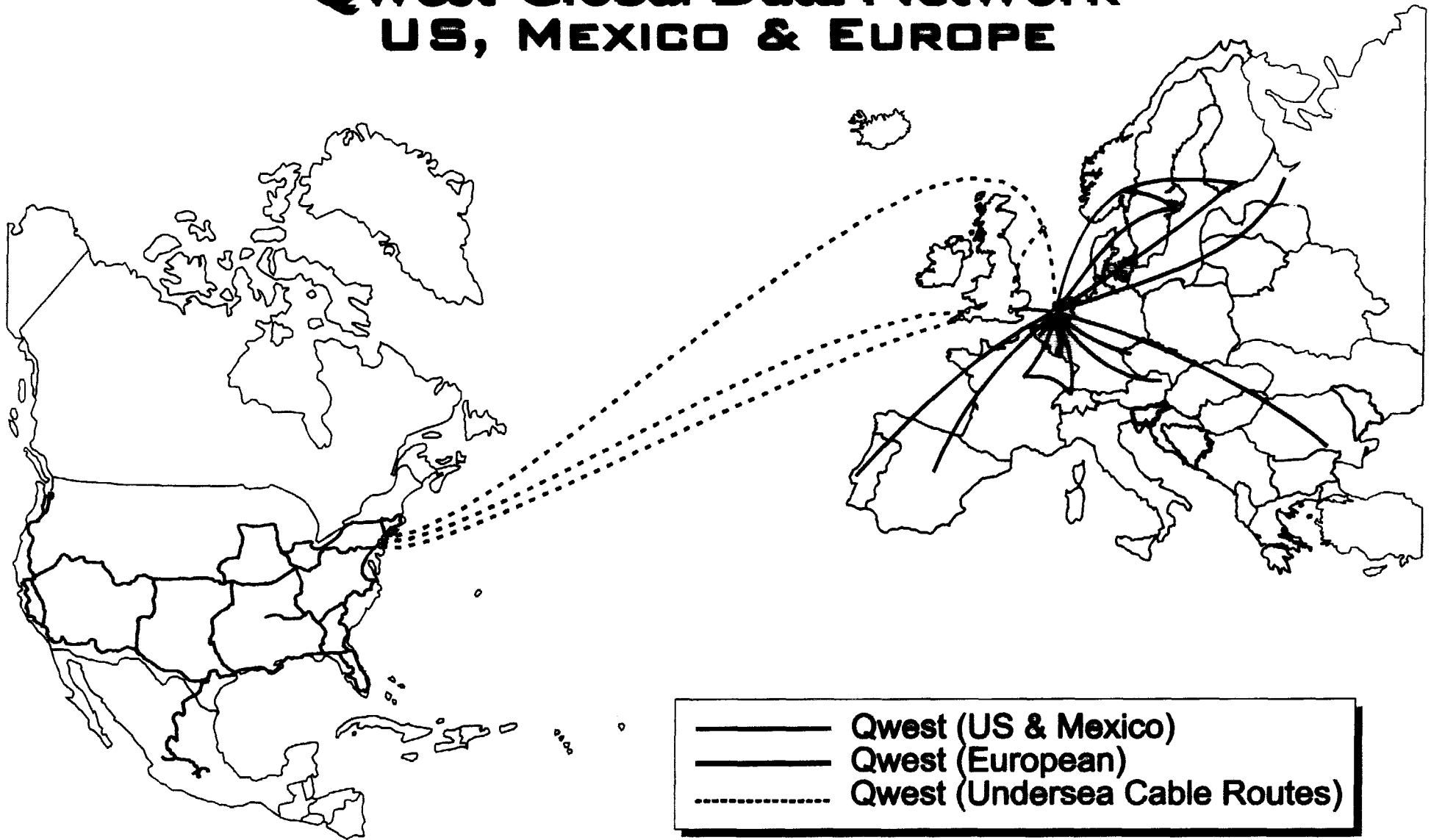


# Qwest/EUnet



# Qwest Global Data Network

## US, MEXICO & EUROPE



## **APPENDIX B**

**“Building the Future-Proof Telco”**

**WIRED, MAY, 1998**



Photographs by Gabor Ekecs

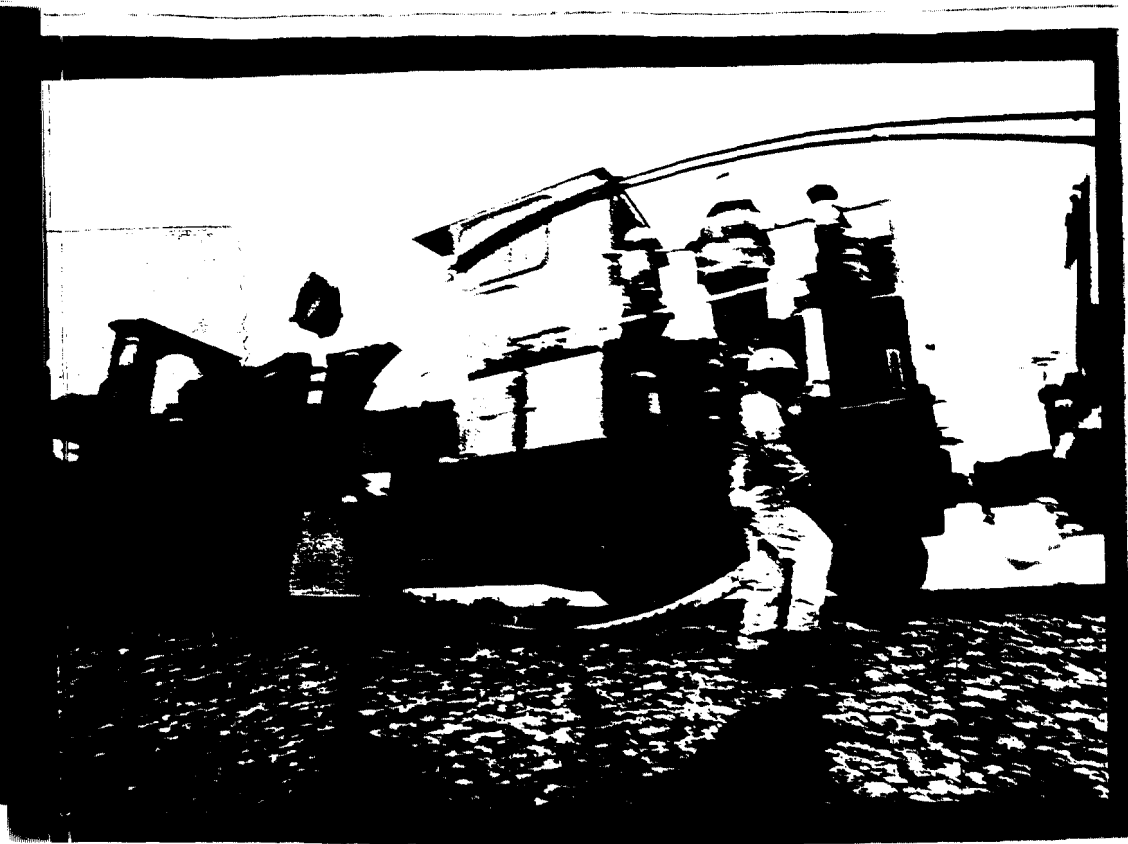
# Building the

Qwest will soon have more capacity than AT&T, MCI, Sprint, and WorldCom



...for a week, the capacity of it alongside

...alongside



# Future-Proof Telco

put together. And none of them saw the upstart coming. By David Diamond



FUTURE-PROOF  
TELECOM



SPY 5001

...can place... extends its arm to dig up the

...the path for the 21st century railroad... can

**A**s ambitious projects go, this one conjures images of the laying of the railroads, the 19th-century phenomenon that catapulted the United States from the slowpoke days of horses and sailing ships and canal barges into the Industrial Age. But Joseph Nacchio, CEO of Qwest Communications International, which is hurriedly sinking 16,285 route miles of fiber-optic cable into American soil in an effort to truly catapult the nation into the Information Age, prefers another historical metaphor.

"Let's say it's 1859. I come out of the hills of Pennsylvania. I tell you, 'Hey, guess what I just found? I've got this new source of energy. It's oil. And it's going to dramatically lower the cost of energy.' You look at me kind of cockeyed and say, 'Hey, what are you crazy? The coal guys — they've got the railroads, they've got the distribution, they've got the customers.' The last thing I can say to you is, 'Heck, don't worry about it. See all those horses out there crapping in the street? Sixty years from now there's going to be something

called automobiles that will burn this stuff and 80 years from now these guys in Delaware will use it to make something called plastics.'"

OK, so the folks who discovered oil in Titusville, Pennsylvania, couldn't see that clearly into the future. But they did have a vision: They knew that in an energy-based economy, if you could change the price performance of energy, something big was bound to happen. Likewise, Nacchio predicts, "if we can change the price performance of bandwidth and long distance, if we can collapse

distance and time, something big is going to happen. We're not going to be the guys that are going to design it," he continues, "it's going to be all the complementary industries. It's going to be like an organic system. There are other folks that contribute to the ecology. We just take the one key element of the system — bandwidth — and push it dramatically."

*Dramatically* is the operative word here. From out of nowhere, Denver-based Qwest is becoming the fifth company to run a nationwide fiber-optic network, and the one with the most promise of

meeting the country's postmillennial communications needs. Qwest's network, expected to be running full tilt by mid-1999, will be packet-switched and capable of handling both data and voice traffic. And, according to Nacchio, it could by next year be carrying as much as 80 percent of the Net's backbone over its fourth-generation fiber, even if competitors

Contributing writer David Diamond (ddiamond@well.com) wrote "Whose Internet Is It, Anyway?" in *Wired* 6.04. He lives in Kentfield, California.



## Qwest CEO Joseph Nacchio left a 26-year stint at AT&T to build a network of his own — and, possibly, get revenge on his former employer.



double their capacity. As early as next spring it will have more bandwidth than the networks of AT&T, Sprint, MCI, and WorldCom combined – with enough left over to carry all of today's IP traffic. In fact, the network could carry all of today's telecommunications traffic on four of its 48 fibers. Eventually, Qwest will be able to carry more than 2 trillion bits per second, compared with around 40 billion bits per second over the systems of today's brand-name telcos.

Already, the upstart company has come forward with the first application for its high-speed network: 7.5-cents-a-minute long distance service – over the Net – in nine US cities as of mid-March. Because of all the available bandwidth, the service doesn't suffer from the poor quality of compressed voice. Qwest's Q.talk, unlike other long distance Net offerings, doesn't have to squeeze voice from 64 kilobits to as low as 7 kilobits, so it eliminates latency problems such as stutters and lags.

Though the company still relies somewhat on the traditional circuit-switch method of telecommunications – where the entire call, pauses and all, is sent over dedicated lines between two parties – it's moving toward an entirely packet-switched network. With packet switching, a phone conversation is chopped into little packets and sent through to its destination. For maximum efficiency, packets are sent only when there are packets to send.

Qwest is operating under an if-you-build-it-they-will-come vision. Bandwidth restrictions, the company believes, have held back development of all manner of innovation. Now, the prospect of virtually endless throughput will

free up the planet for a host of new applications in such areas as high-speed video and multimedia.

It's not everyone's view of the future. In fact, some critics envision a bandwidth glut. But in Nacchio's mind, that's the sort of reaction one might expect from coal barons dumbfounded at the sight of oil gurgling exuberantly out of new wells. "When AT&T, MCI, and Sprint were building fiber networks in the '80s," recalls Lewis Wilks, Qwest's president of business markets, who was at MCI at that time, "we all continually expressed a belief that we would never exhaust the supply. Suppliers have continually underestimated the demands of the market." David Yedwab, a telecom analyst and executive vice president at

Eastern Management Group in Bedminster, New Jersey, adds, "At this point in time, network capacity is like the first corollary to Murphy's Law: Whatever capacity there is will be filled up by the time it takes to build it."

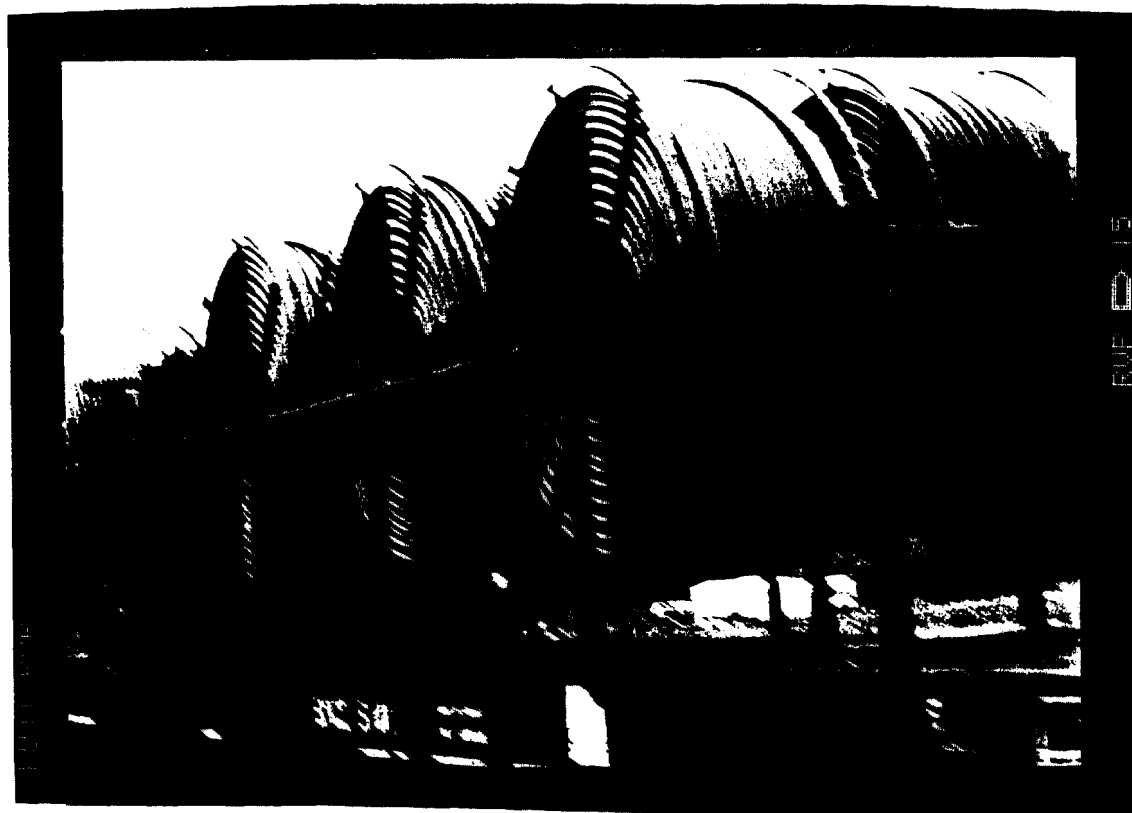
Meanwhile, the basic phone line hasn't improved materially over the last 15 years. Though computer clock speed has increased a thousandfold and dropped in price to one-tenth of what it was, phone lines have seen no capacity increase at twice the price. You can pay US\$80 for an ISDN line and maybe be able to transmit at 1.5 Mbps. Even if you transmit via cable or digital subscriber line, it's still nowhere near the increase in the speed of, say, a 300-MHz Pentium II. "Qwest will give people

the ability to interact as fast as they can compute," says Tom Friedberg, an industry analyst with Denver-based Janco Partners.

CEO Nacchio is a 26-year AT&T veteran who ran its two biggest businesses – consumer and business long distance. He's the fellow you should be thanking when you get paid to switch long distance carriers, a phenomenon he's credited with implementing. Nacchio was considered a possible successor to former chair Robert Allen, but he lost out in October 1996 when, in a surprise move, Chicago publishing executive John Walter was named AT&T president and heir apparent, though C. Michael Armstrong is now chair. Nacchio clearly is ready to take on his former employer, and even

178 ▶

**Qwest is laying two types of conduit:  
one containing hair-thin fiber-optics for immediate use,  
the other empty, anticipating endless  
demand for bandwidth in the future.**



# Qwest

◀ 127 sounds as if he's dancing on a dinosaur.

Indeed, he makes an art form out of being blunt. "The retail long distance business in the US is an \$85 billion business controlled by people who don't get it," he says, with characteristic Jersey-boy-does-good directness. "There are significant changes in demand and the cost of supply, and we're walking in with a low-cost position. An opportunity like this doesn't come along that often. When everybody was looking the other way, Qwest decided to build its own network. Qwest should never have been allowed to exist."

"I don't know where he comes up with that," snorts Frank Ianna, AT&T's executive vice president of network and computing services. "Anyone can deploy fiber, but that doesn't make a service that is functional and usable for mission-critical operations. Where's their track

per average business day.

Another potential problem involves POPs, the points of presence that connect Qwest's nationwide network and local exchanges. Qwest needs access to those switches, but they're owned by local exchange carriers like the Baby Bells, companies that have been reluctant to let a high-speed competitor come in and take away business they want themselves.

Qwest is not the only player pushing for local-switch access, which was assured under the Telecommunications Act of 1996. But while legislation opened up the long distance market to local carriers and vice versa, analyst Friedberg says local exchange carriers are using "bureaucracy and delay to slow the inevitable." Southwestern Bell, for example, has sued the federal government, challenging the constitutionality of the Telecom Act's efforts to spur competition. Thus far, it hasn't

are some switching synergies." Other synergies, too. Friedberg views Nacchio and LCI chair and CEO H. Brian Thompson (an MCI alum) as "the black sheep of their former companies pushing to get revenge."

Among the benefits of the merger: Qwest, which gets to keep its name, inherits an instant sales force. For the business market alone that means Qwest will add 500 salespeople to its current 100-person business sales force. Thompson says LCI is the only company in the industry that can bill in one-second increments. And when it comes to local access, LCI has a local division – headed by former Justice Department antitrust chief Anne Bingaman – that resells local loops.

**M**eanwhile, nothing is slowing the construction of the Qwest network – except, perhaps, some bad weather.

Right now, an army of 1,500 latter-day railroaders is slaving to make the mammoth project a reality: 16,000 miles at an average 120 miles a week. The vast majority of the cable is being laid alongside existing railroad tracks, installed by four or more "rail plow" cars. A custom-designed 25-foot arm extends from those cars and digs up the earth 12 feet from the side of the tracks. It then lays in protective tubing – 2-inch-diameter high-density polyethylene conduit – and cables 4 feet below the surface.

Throughout America, hundreds of itinerant Qwesties are working on the network much the way their great-great-grandfathers might have worked on the railroad. Instead of tents and wood shacks, these guys live in Motel 6s or Airstreams equipped with 18-inch satellite dishes for pulling in hometown sports. As of the end of February, 10,000 rail miles – or 93 million feet of conduit and 8,000 miles of cable – has been installed. Rail plows have run through dried lava fields in New Mexico, through the 6-mile Moffat Tunnel in Colorado, and down river gorges in Oregon. There's one in Kentucky, one in New York's Amtrak tunnel, and one making its way through the pines of Georgia, digging up red clay along tracks that were instrumental in a rebel blockade during the Civil War.

**P**hilip Anschutz, who owns more than 86 percent of Qwest – 55 percent of a combined Qwest-LCI – previously owned the Southern Pacific Railroad. When he sold the railroad to

## **A \$4.4 billion merger with LCI International, announced in March, will add 500 new bodies to Qwest's 100-person business sales force.**

record?" Nacchio's entrepreneurial bravado is eliciting a strong reaction over at MCI, too. "I see a lot of hype about the kind of fiber they're carrying the network on, but not about anything else," says Jack Wimmer, MCI's executive director of network technology and planning. "I mean, do they have consolidated billing for their business customers? The fundamental difference between carriers is not the fiber. The real difference is in the range of services they provide."

The fact is, while Qwest may be driving pretty strong to the hoop, by no means is it assured a slam-dunk. For one thing, Qwest faces the daunting task of convincing customers it can serve them better than its more powerful competitors. When AT&T recently announced plans to boost the capacity of its nearly 41,000 route miles of fiber, some skeptics suggested the company would have trouble meeting its plans to upgrade, if only because its cables are not uniform. But AT&T has an edge that is difficult to ignore: an installed base of customers that thrashes the competition. In its efforts to launch a communications revolution, Qwest must deal with the nagging fact that AT&T carries more than one-quarter of a billion calls

been a snag for Qwest, according to Wilks. "We've had no trouble getting connectivity," he says.

But the speed doesn't happen until Qwest has access to the last mile, the local routes. To that end, Wilks says, the company is working closely with the Baby Bells, cable companies, and all the major wireless companies to complete its network. Wilks considers Qwest's backbone a way for local carriers to leverage a host of new technologies, such as digital subscriber lines, cable modems, and high-speed Internet access.

The company made a big move toward overcoming these obstacles when, in March, it announced a planned \$4.4 billion merger for stock with LCI International, the fast-growing long distance carrier. While the merger must be approved by shareholders and regulators – Qwest expects that to happen by the end of May – it could be the big edge the company needs. The combined entity will create the nation's fourth-largest long distance player, assuming the WorldCom-MCI deal goes through. "It gives Qwest a lot of traffic. It may be an inexpensive way of loading the network," says analyst Friedberg. "And there

Union Pacific in 1996, he negotiated to buy the rights of way alongside the tracks of both railroads. Combined, they represent the cable route of a significant portion of the network. The rest of the cable is run along lines for which Qwest leases the right of way for up to 50 years, or along interstate highways, where it leases rights of way from transportation authorities for 20 or 25 years. Eighty-five percent of the Qwest network is strung along railroads.

Before selling his railway to Union Pacific, Anschutz spun off a corporate division named Southern Pacific Construction, which does cable repair and additional builds for big telecom carriers.

"We realized we could charge enough that we could afford to put some in for ourselves," says Nacchio. "When everybody was saying there's enough capacity, Phil made the bet."

In 1995, Qwest laid out its plans for a nationwide network, with connections into Mexico and later an intercontinental cable to Europe. At the time, the major telcos were focusing on other arenas. The Internet was just taking off. And there were some breakthroughs in the componentry of the long distance net-

works. For example, glass had moved to its fourth generation with Lucent Technologies's development of nonzero dispersion-shifted fiber. With its improved dispersion characteristics, you could send a signal between 50 and 60 miles before having to capture and regenerate it, compared with 30 miles using the old glass.

Today, the biggest thing working in Qwest's

## The trick for Qwest was to build the network with other people's money.

favor is undoubtedly the railroad itself, the monumental transportation infrastructure that was painfully laid from coast to coast by Chinese immigrants and raucous laborers. The new telco didn't have to go out and negotiate for as much as 6,400 miles of railroad right of way. "Other people can build fiber networks, but only Qwest has infeasible railroad rights of way," says analyst Friedberg.

The trick for Qwest was to build the network with other people's money. Even with its railway advantage, the company estimated it would cost \$2.4 billion to string the darn thing

along prairies, into cities, down canyons, over purple mountains' majesty, et cetera. The company raised only \$800 million in capital through senior debt and a June 1997 IPO. Why not raise the remainder by letting other telcos piggyback along – charge them to have their cable installed side by side with Qwest's?

The company lured in what Nacchio calls "anchor tenants" – telcos that have ponied up

a total of \$1.4 billion for Qwest to lay their cable alongside its own on some 13,000 miles of the network. Among the owners of what Qwest calls "dark fiber" are GTE, Frontier, and WorldCom. Says Nacchio: "We raised enough money that way that we essentially built our network for free."

But isn't he helping out his competitors? "Our business model would argue that we got more out of it than they did," he retorts. "We knew we'd compete with them sooner or later, but we needed their cash."

Qwest has its sights set on three mar- 180 ►

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Kodak [www.kodak/go/further/](http://www.kodak/go/further/)

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Worldwide Internet Publishing Corp. [www.wipc.net/](http://www.wipc.net/)

Xerox [www.xerox.com/](http://www.xerox.com/)

ZDTV [www.zdtv.com/](http://www.zdtv.com/)

# Qwest

< 179 kets. First, other carriers, whether they are large telcos like WorldCom, Baby Bells entering the long distance business, or Internet service providers. Qwest estimates there are 400 to 500 such carriers that could use its network. The second group comprises traditional US businesses looking for such advanced services as voice-over-IP and voice-and-data. The third market consists of regular consumers. Qwest has already made a move on other telcos' customers by offering a service known in the industry as "dial around." Customers in 30 or so US cities who want traditional long distance voice service dial a code (10056) and then the number they want. The call goes over Qwest's network and users get billed by their local phone company. Qwest charges 10 to 12 cents a minute for all domestic calls, 24 hours a day, seven days a week.

**C**reating an Internet backbone takes an amazing amount of coordination.

"I said I needed a backhoe and a forklift for Charlotte," barks Mike Smith, Qwest's rail-plow manager, into his cell phone. "But cancel

it because we're going to Greensboro instead. But send the truck." It's afternoon on a colorless Georgia Tuesday and Smith is having maybe his 13th cell phone conversation of the day. A beefy Oklahoma rancher, he has orchestrated construction in about a dozen states before parking his Airstream in a funky trailer park in a small town amid pines and Confederate flags. He drives a white Ford Expedition bearing the Qwest logo from site to site along the northernmost reaches of the network's Atlanta-Tallahassee stretch. At his side is Burt Meiklejohn, railroad operations manager. A native of New Mexico who also has been all over the network, it's his job to coordinate the rail plow with railroads on which it leases rights of way. Meiklejohn, too, is on the heavy side, and is constantly joking with the more steadfast Smith. The two are like a married couple – or "virtual brothers," according to Meiklejohn, who provides a running commentary on Smith's driving habits, reminds him when to turn, and finishes his sentences.

The task at hand is the installation of thousands of miles of conduit. The next step will be to use compressors at "handhole" stations each mile along the route to pull the fiber

through the conduit and connect the cable. The system allows for new line to be pulled through in the future, in case the technology improves or bandwidth needs escalate.

In fact, throughout the US, Qwest workers are laying two conduits. There's an orange one containing 48 of the company's own fiber-optic cables (each one as thick as a human hair), as well as 48 for other carriers. The second conduit is black and empty. It's there for future use.

"Ten years from now if there's a leapfrog in the glass, if there's another generation, we simply pull another cable or two without having to dig up the ground," says Nacchio.

Qwest's network – 3,700 miles of it is up and running – will be a bidirectional Sonet (synchronous optical network) ring. The bidirectional configuration means that if a fiber is cut, traffic can be rerouted in the other direction in 50 milliseconds. Self-healing is the term used in the industry. "Their technology is state of the art and low cost," says Christine Nairne, an analyst with Hambrecht & Quist. Qwest will eventually be capable of transmitting data at 10 Gbps, although initially it is operating at 622 Mbps.



Each of the 48 fibers in Qwest's network can be divided into at least eight wavelengths – aka windows – and each wavelength has the potential of transmitting data at a rate of 10 Gbps. Qwest has already lit its second window and may be lighting up more if demand increases. "That's a lot of bandwidth we could bring online," says Nacchio. "What we're expecting is that two windows will produce the first billion dollars of revenue. We've got virtually unlimited capacity, without ever digging or pulling again."

In Georgia, the rail plow is ahead of schedule, digging up the red clay at a rate of three miles a day. One moment Smith and Meiklejohn are calculating how long it will take the man who restores the gravel portion near the track to catch up with the unexpectedly fast work of the plow. The next moment they're determining where the nine-car train can be pulled off the tracks so a scheduled freight can pass. The next moment they're dissing the work of the railroad's flag guys, whose job it is to mark various other utility lines that might pose impediments to the rail plow – blue flags indicate a water line, yellow a gas line, orange a phone line.

Somewhere south of Atlanta, an AT&T lineman watches while the rail-plow workers approach an orange-flagged AT&T fiber-optic cable. He looks on as the Qwesties determine whether to thread the line above or below their competitor's cable. Cutting AT&T's cable could be an expensive proposition for Qwest, which would have to compensate for the damage. Yes, without even trying, AT&T is out there making things difficult, like some giant obstacle created by nature centuries ago.

Nacchio makes it sound like ancient history as he rattles off when fiber-optic cables were sunk: early '80s MCI; mid '80s Sprint; AT&T and WorldCom between '88 and '90. "They're all underinvested in their core networks," he says. As for the merger of MCI and WorldCom, which is expected to be completed by the end of 1998 pending Justice Department approval, he has this to offer: "They're collecting antiques. You put two old platforms together and you get one big old platform." The problem, as Nacchio sees it, is that the competitors are sitting on glass that's fully utilized – and they can't get at it. "The networks the telephone companies built in the '80s were based on

the hypothesis that fiber-optic cable was so superior to coaxial cable or digital radio that you'd never need more fiber – the stuff was direct buried," he says. "You dug a trench 2 feet down, threw it in, covered it up, boom. Now you can't get at that glass. You can't pull it out.

"What happened over the last four or five years was the guys who controlled the long distance industry were smelling that the Telecommunications Act of 1996 was going the wrong way for them," he continues. "They essentially lost it – the Bells ran them down. And they went on a diversification strategy. They went into such complementary technologies and markets as global and wireless communication." They also stuck with the circuit-switch method, as opposed to moving into the more efficient packet switching.

Charles Fleckenstein, Sprint's manager of technology services, refuses to accept Nacchio's assertion that the long distance companies have too much invested in past-tense technology. There's exasperation in his voice when he retorts, "Glass is glass." Sprint, MCI,

and AT&T are each embarking on ambitious plans to pump more light through their fiber-optic cables by using wave-division multiplexing technology, which Qwest is also employing. Multiplexing allows for multiple wavelengths of light on a single fiber-optic strand, which means more information can be moved down a line.

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Level 3 came to life with the same leadership (Crowe) and the same financing (Omaha-based Peter Kiewit Sons) as did MSF Communications, the local telecom phenom that went public in May 1993 and was acquired by WorldCom in 1996 for \$14.3 billion. Level 3 will be investing as much as \$3 billion in a network that differs significantly from Qwest's. Unlike its long-distance-only competitor, Level 3 will be an end-to-end network – it will own the last mile. But like Qwest, Level 3 will be an IP-only operation. Reasons Crowe: "Trying to be good at two things is a hard way to serve the Lord."

"Joe is a great guy, but he might be exaggerating slightly," responds James Crowe, president and CEO of Level 3 Communications, "In telecom now, giving someone a four-year head start means you might as well not be there," boasts Nacchio. "I feel like an emerging oil baron."

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Crowe, who was chair of MSF, had been on Qwest's board until last November, and he wants to make it clear that he is a friend of Anschutz and Nacchio. Crowe sees room for both new companies. "This is not a zero-sum game for us," he insists. "And the match is not between Level 3 and Qwest. The real battle is carriers like Level 3 and Qwest versus

182 ►

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# Qwest

◀ 181 the legacy guys. It's really an IP versus circuit-switch battle."

To the citizens of the Georgia towns along the cable route there is not much evidence that a mammoth project is under way. At railway crossings, when drivers look left or right they may catch a glimpse of a nine-car train digging up the earth, but it doesn't look any different than a track-repair operation. On roads that run alongside the rails, drivers can see places where the orange and black conduits peek out from the ground; those are places where the cable will be encased in steel pipe to protect it from a particular hazard. Or they might see a backhoe operator flattening out the ballast along the track after the rail plow has been through. None of it attracts much attention. Likewise, the dozen or so men working this site aren't making much of an impact on the communities. The crew members stay in their motels or Airstreams and eat at family-style chain restaurants, and when the rail plow is 50 or so miles down the line, they move to a new

motel or trailer park and eat at the same restaurant chains.

Back in Denver, where the oversize blue Qwest logo now dominates the skyline, Nacchio has assembled a telecom dream team. The CEO himself was hired by Anschutz, following a clandestine meeting in a hangar at a Teterboro, New Jersey, airport. (Nacchio replaced the original CEO, Douglas Hansen, because the company needed a leader who could help the company raise money in the public markets.) Qwest's powerhouse lineup includes Seese, who was drafted from AT&T, where he ran its voice and data networks; Wilks, former president of GTE Communications; Anthony J. Broadman, who oversees fiber sales and held several senior positions at Sprint; Stephen M. Jacobsen, who's in charge of consumer markets and was a regional vice president with AT&T's consumer and small-business unit; and Nayel Shafei, who oversees product development and graduated from the MIT Media Lab. Get the picture?

"They are phenomenally impressive, both in their background and in their ability to articulate a vision of telecommunications services

for the future," says Hambrecht & Quist's Nairne. "There's every indication that they have the team to do it." The company's 1997 revenue of \$670 million represented more than a 200 percent increase over the previous year, and it generated earnings of \$14.5 million. Nairne expects revenues will rise to nearly \$1 billion in 1998.

"If you look at our mission statement, we talk about being able to transmit images the way telephone networks transmit voice," says Nacchio. By the middle of 1999 the network will encompass 125 US cities, as well as 14 Mexican markets and a handful of European cities. Q-talk, the company's voice-over-IP service, is a precursor to the converting of all systems to packet technology for voice and other applications.

Technology aside, Qwest does face the challenge of muscling its way into the nation's long distance consciousness. The proposed merger with LCI will obviously help - it will create a combined customer base of more than 2.3 million business and residential customers. Meanwhile, the company is embarking on a \$50 million advertising effort aimed at business and consumers. Nacchio is Jersey

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confident. "Look, at AT&T we were swapping 200,000 customers a day with the other long distance carriers. That many would leave and that many would come back. Qwest can sneak in there," he says. The Yankee Group, however, puts the figure closer to 70,000.

Some telco watchers have suggested that what Nacchio is doing is merely creating a company that his larger competitors will be forced to buy. Nacchio himself denies there's a sale sign being hoisted over Qwest's big blue logo — though it would be Anschutz's call anyway. "There are people speculating that Qwest's network has been designed to be sold," says analyst Yedwab. "But in the interim it has been designed to be a very good business, and they've been hiring an awful lot of senior management talent you wouldn't hire if you were just building a business to sell."

**M**eanwhile, a nine-car rail-plow train is creeping along tracks in Georgia, installing the future at the deliberate speed of one mile an hour. As it plods forward, conduit unrolls from huge spools. The pipe is threaded through the plow arm, and at a slow and even pace, it's

then installed into the trench that the plow arm's steel shank is steadily digging into the red clay.

Ray Holly, the hefty former crane operator who runs the rail plow, sits in a glassed-in cab, pushing levers and communicating via headset with the engineer who operates the 125-ton locomotive. A safety inspector named Billy Hitchcock stands in an open car, keeping track of the footage in a notebook. When he gets back to his motel room, he will transfer his

straw. The train pulls past fundamentalist churches and tarpaper shacks and convenience stores and subdivisions. The young men step over Miller bottles and corn chip bags.

The gathering dust conjures images of an earlier era, when the rails themselves were planted. And the men's Western attire further contributes to an eerie sense of déjà vu. It's as if they are living out some unexpected legacy. And Miller bottles and corn chip bags notwithstanding, there's something truly sweet about

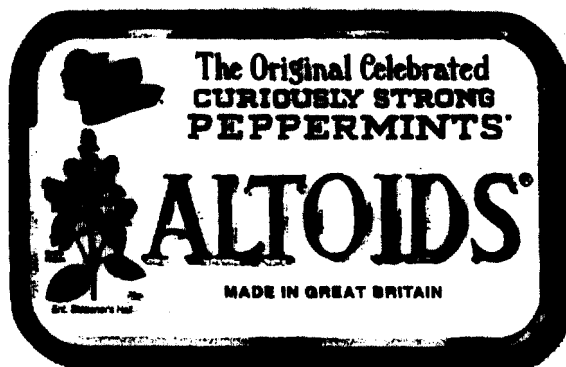
## **The laborers who laid the rails in the 1800s had no way of knowing their work would launch more than one revolution.**

work into a Pentium 233 laptop, and then transmit the information via fax modem to the engineers at the Network Management Center in Denver.

Two young laborers from Montana walk beside the train, ready to jump into action if anything goes wrong. One munches on a piece of meat, which he describes as "Oklahoma white-tail deer." The other sucks on a piece of

this little scene: the layering of one monumental infrastructure on another, the recycling of one era's visionary enterprise for another's. The laborers who laid the rails in the 1800s had no way of knowing their work would launch more than one revolution. But if Qwest's mammoth project succeeds — and there's no evidence yet that it won't — it would be nice to hear somebody give them some credit. ■ ■ ■

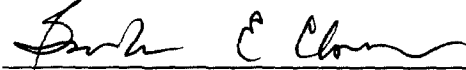
# **ARE YOU A MINT OR A MOUSE?**



## **THE CURIOUSLY STRONG MINTS**

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I, Barbara E. Clocker, hereby certify that on this 14th day of September, 1998, a copy of the Comments of Qwest Communications Corporation filed in CC Docket No. 98-146 was hand delivered to the parties listed below.

  
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